

WHAT IS CLAIMED IS:

1. A decoder for performing data error correction within a codeword comprising:

5 means for calculating a syndrome from said codeword;
means for generating an error polynomial from said syndrome;
means for determining a value corresponding to the number of data errors within said codeword from said error polynomial;
means for determining an error location from said error polynomial; and
10 means for calculating an error magnitude from said error polynomial,
said decoder characterized in that said means for determining said value corresponding to the number of data errors is performed on data corresponding to a first codeword while said means for determining said error locations and said means for determining said error magnitudes are performed on data
15 corresponding to a second codeword.

2. The decoder of claim 1 further characterized in that said codeword is forwarded as an output of said decoder should said value corresponding to the number of data errors within said codeword be greater a threshold value.

3. The decoder of claim 2 further comprising:
means, responsive to receiving said codeword, said error locations, and said error magnitudes, for correcting errors within said codeword and forwarding result as said output of said decoder.

4. The decoder of claim 3 further characterized in that said error locations and said error magnitudes corresponding to said codeword are completely calculated should said value corresponding to the number of data errors within said codeword be less than or equal to said threshold value.

5. The decoder of claim 1 wherein said means for generating an error polynomial is accomplished using a Euclid's algorithm block.

6. The decoder of claim 1 wherein said means for determining a value corresponding to the number of data errors within said codeword is accomplished using a first Chien block.

7. The decoder of claim 6 wherein said means for determining an error location from said error polynomial is accomplished using a second Chien block.

8. The decoder of claim 7 wherein said means for determining an error magnitude from said error polynomial is accomplished using a Forney algorithm.

9. The decoder of claim 6 wherein said means for determining an error location from said error polynomial, and said means for determining an error magnitude from said error polynomial are accomplished using a Chien/Forney block.

10. In a decoder used for error correction of a codeword, a method for determining error locations and error magnitudes comprising the acts of:

calculating a value corresponding to the number of codeword errors;

forwarding said codeword as an output of said decoder, should said value corresponding to the number of codeword errors be greater than a threshold value; and

determining said error locations and said error magnitudes corresponding to said codeword, should said value corresponding to the number of codeword errors be less than or equal to said threshold value,

said method characterized in that said act of calculating said value corresponding to said number of codeword errors is performed on data corresponding to a first codeword while said act of determining said error locations and said error magnitudes is concurrently performed on data corresponding to a second codeword.

11. The method of claim 10 further characterized in that said act of calculating a value corresponding to the number of codeword errors is accomplished using a first Chien search block.

12. The method of claim 11 further characterized in that said act of determining said error locations is accomplished using a second Chien search block.

5 13 The method of claim 12 further characterized in that said act of determining said error magnitudes is accomplished using a Forney algorithm block.

10 14. The method of claim 11 further characterized in that said acts of determining said error locations and said error magnitudes are accomplished using a Chien/Forney block.

15 15. A decoder for error correction of a codeword comprising:
means for calculating a value corresponding to the number of codeword errors;

means for forwarding said codeword as an output of said decoder, should said value corresponding to the number of codeword errors be greater than a threshold value; and

20 means for determining error locations and error magnitudes corresponding to said codeword, should said value corresponding to the number of codeword errors be less than or equal to said threshold value,

25 said decoder characterized in that said means for calculating said value corresponding to said number of codeword errors is performed on data corresponding to a first codeword while said means for determining said error locations and said error magnitudes is concurrently performed on data corresponding to a second codeword.

30 16. The decoder of claim 15 further characterized in that said means for calculating said value corresponding to the number of codeword errors is accomplished using a first Chien search block.

17. The decoder of claim 16 further characterized in that said means for determining said error locations is accomplished using a second Chien search block.

5 18. The decoder of claim 17 further characterized in that said means for determining said error magnitudes is accomplished using a Forney algorithm block.

10 19. The decoder of claim 16 further characterized in that said means for determining said error locations and said error magnitudes are accomplished using a Chien/Forney block.

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